REMARKS

Claims 1-3, 5-22, 25, 26, 29, 30 and 33-34 are pending in this application. For purposes of expedition, claim 11 has been amended to correct a typographical error.

As a preliminary matter, Applicants note that the examination of the application has not been exemplary of what is expected from a USPTO examiner. The application has been pending over 5 years, since March 17, 1999. During the 5 years period, there have been more than seven (7) Office Actions issued by the same Examiner, including the first Office Action (Paper No. 6) dated on October 25, 2001, the premature final Office Action (Paper No. 10) dated on April 16, 2002, the non-final Office Action (Paper No. 13) dated on May 24, 2002, the premature final Office Action (Paper No. 17) dated on November 27, 2002, yet another non-final Office Action (Paper No. 22) dated on February 24, 2003, yet another premature final Office Action (Paper No. 25) dated on September 5, 2003, and now non-final Office Action (Paper No. 20031223) dated on February 19, 2004.

Clearly, piecemeal examination, which should be avoided under MPEP §707.07(g), has been engaged throughout the prosecution of the application. Each time the Office Action is issued, the same combination of what the Examiner alleges as "Applicant Admitted Prior Art" (as related to FIGs. 32-39 of Applicants' disclosure) and Gunjima, U.S. Patent No. 5,587,816, has been used in various forms, even though the same combination has been repeated rebutted by Applicants. On at least two different occasions, Applicants conducted an in-person Office Interview with the Examiner to explain the distinctions of Applicants' claimed invention relative to the Exaniner's proposed combination of what the Examiner alleges as "Applicant

Admitted Prior Art" (as related to FIGs. 32-39 of Applicants' disclosure) and Gunjima, U.S. Patent No. 5,587,816. Each time, the Examiner has expressed an appreciation of Applicants' claimed invention relative to "Applicant Admitted Prior Art" (as related to FIGs. 32-39 of Applicants' disclosure) and Gunjima, U.S. Patent No. 5,587,816.

Specifically, on an in-person Office Interview most recently conducted on 19 December 2003, and expressly summarized in the Examiner Summary Record (Paper No. 20031219), the Examiner states that,

> "Applicant's representative explained the background information and how such information does not quality as prior art, the features of Applicant's claimed invention and how the background art and Gunjima '816 fail to disclose the features of Applicant's independent claims 1, 13 and 20, including "a reflective polarizer arranged at an upper portion of the light control element so that a polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element" and that "the light control element is the only light control element arranged between the illumination device and the reflective polarizer". **Examiner agreed** that the applied prior art, including Gunjima '816 does **not** disclose the above features of Applicant's claims 1, 13 and 20, and will issue another Office communication soon. However, an updated search will be necessary before any communication will be issued accordingly. Applicant needs not file a statement of substance or other papers."

In view of that agreement reached with the Examiner, Applicants expect the Examiner to make every effort to allow the application, particularly, when claims 11, 19, 25, 29 and 33 have already been allowed without the necessity of amendment. See previous Office Action (Paper No. 25) dated on September 5, 2003.

Instead of receiving a Notice of Allowance, the Examiner has reopened prosecution and again engaged piecemeal examination of the application. Yet

another non-final Office Action (Paper No. 20031223) has been issued, along with newly cited prior art, including Weber et al., U.S. Patent No. 6,025,897, Nakamura et al., U.S. Patent No. 5,986,723, and Yoshioka et al., U.S. Patent No. 6,323,918. While newly discovered prior art can be utilized to support a rejection, previously addressed rejections should not be reinstated.

Unfortunately, the rejection of claims 1-3, 5-7, 10, 12-14, 17-18, 20 and 22 under 35 U.S.C. §103 as being unpatentable over what the Examiner alleges as "Applicant admitted prior art" in view of Gunjima et al., U.S. Patent No. 5,587,816, which the Examiner has agreed to withdrawn, has now been reinstated for different reasons relative to those outlined in the previous Office Action. Specifically, on page 5 of the Office Action (Paper No. 20031223), and in support of the rejection of Applicants' base claims 1, 13 and 20, the Examiner asserts that,

> the AAPA discloses (the "background of the invention" paragraph in the specification; conventional liquid crystal display device of FIG. 25) a structure of a liquid crystal display device comprising:
> an illumination device (51, 53, 54 and 56);
> a light control element (40) arranged at a projected light side of the illumination device;
> a reflective polarizer (30) arranged at an upper portion of the light control element (40);
> the light control element (40) is the only light control element arranged between the illumination device (51, 53, 54 and 56) and the reflective polarizer (30) (see the conventional liquid crystal display device of Fig. 35);
> a liquid crystal display element (20) for controlling polarization of projected light projected from the reflective polarizer (30), so that the major axis direction of a pixel must be arranged approximately parallel to a direction wherein the linearly polarized light component of the projected light projected from the illumination device (51, 53, 54 and 56) is high, in order to obtain maximum light transmittance.

The Examiner then admits that "AAPA does **not** expressly disclose that,

> "a reflective polarizer arranged at an upper portion of the light control element so that a polarized light transmission axis of the

reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element."

However, the Examiner has cited column 5, lines 30-41 of Gunjima '816 for allegedly disclosing that,

> "an average direction of an optical axis of polarization of a light ray emitted from the flat light guide in the flat illumination device approximately agrees with the optical axis of polarization of the polarization sheet on the light-incident side of the liquid crystal display element, i.e., the polarized light transmission axis of the reflective polarizer is approximately in parallel to a major axis direction of pixel of the liquid crystal display element (because the p polarized light is transmitted), and the polarized light transmission axis of the reflective polarizer must be adjusted substantially perpendicular or in parallel to the control axis of the light control element so as to obtain a maximized transmittance so as to obtain a maximized transmittance."

The Examiner has also cited another conventional LCD device as shown in FIG. 26 for disclosing that,

> "the polarized light transmission axis (31) of the reflective polarizer (30) is adjusted to be substantially perpendicular to the control axis (41) of the light control element (40) so as to obtain a maximum transmittance,"

in order to support a conclusion that "it would have been obvious ... to arrange such reflective polarizer in which the polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or in parallel to the control axis of the light control element as claimed in claims 1, 13 and 20 for achieving maximum light transmittance and widen the viewing angle."

In other words, in contrast to the previous rejection as outlined in the premature final Office Action (Paper No. 25) dated on September 5, 2003, in which the Examiner cited **only** FIG. 36 of Applicants' background information in combination with Gunjima '816, the Examiner has now cited **two** different

embodiments of conventional LCD device as shown in FIG. 35 and FIG. 36 in combination with Gunjima '816 in an effort to arrive at Applicants' base claims 1, 13 and 20.

However, this approach is factually incorrect and legally improper. FIG. 35 and FIG. 36 of Applicants' background information are directed to **two** different embodiments of conventional LCD device, with each embodiment suffering a distinct set of problems as addressed by Applicants' disclosed invention.

As the Examiner has admitted on page 3 of the premature final Office Action (Paper No. 25),

> "AAPA as shown in **Fig. 35** does **not** expressly disclose that the polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element."

As a result, polarization conversion efficiency is decreased significantly because "the polarizing conversion cannot be performed effectively by only a single reflection with the conventional composition ... Consequently, the absorption by the respective components is increased." See page 28, line 8 extending to page 29, line 12 of Applicants' disclosure.

In order to address the polarization conversion inefficiency defects, another conventional LCD device as shown in **FIG. 36** of Applicants' disclosure utilizes two light polarizers, i.e., **two optical control elements 40, 42** to adjust the polarized light transmitting axis (31) of the reflective polarizer (30) substantially perpendicular or parallel to the conversion axis of the light control elements (40, 42) so as to obtain a maximum transmittance. However, **two optical control elements 40, 42** are used, as shown in FIG. 36 of Applicants' disclosure, and when the two optical control

elements 40, 42 are used, multi-reflection is repeated and the efficiency is decreased significantly due to the influence of the change in the polarization, as described on pages 32-33 of Applicants' specification. In addition, polarized light dissolution will be generated.

These two conventional LCD, as shown in FIG. 35 and FIG. 36 of Applicants' disclosure, are unique in their own set of problems as identified by Applicants' disclosure, are **not** compatible and, can**not** be combined in the manner suggested by the Examiner.

In contrast to the background art, as shown in FIG. 35 and FIG. 36 of Applicants' disclosure, Applicants' disclosed invention seeks to address noted deficiencies of two different embodiments of a conventional LCD device, as shown FIG. 35 and FIG. 36, and to obtain an optimum combination of components for a LCD device provided with a single light control element for high polarization conversion efficiency, and improved brightness at a normal angle. Specifically, Applicants' independent claims 1, 13 and 20 each defines the use of a **single** light control element arranged at a projected light side of the illumination device in order to increase transmittance of the display light, and that such a light control element is the **only** light control element arranged between the illumination device and the reflective polarizer, and that the polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element. As a result, the conversion axis of the light control element is intercrossed perpendicularly with the polarized light transmitting axis of the reflective polarizer so as to improve the polarized light conversion efficiency and the polarized light transmittance.

Specifically, base claim 1 defines a liquid crystal display device comprising:

an illumination device;
a light control element arranged at a projected light side of the illumination device;
a reflective polarizer arranged at an upper portion of the light control element so that a polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element;
a liquid crystal display element for controlling polarization of projected light projected from the reflective polarizer; and
a screen arranged at an upper portion of the liquid crystal display element;
wherein the light control element is the only light control element arranged between the illumination device and the reflective polarizer.

Similarly, base claim 13 defines a liquid crystal display device comprising:

an illumination device;
a light control element arranged at a projected light side of the illumination device;
a reflective polarizer arranged at an upper portion of the light control element so that a polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element;
a liquid crystal display element for controlling polarization of projected light projected from the reflective polarizer so that a major axis direction of a pixel of the liquid crystal display element is arranged approximately parallel to a direction in which a linearly polarized light component of projected light projected from the illumination device is high; and
a screen arranged at an upper portion of the liquid crystal display element;
wherein the light control element is the only light control element arranged between the illumination device and the reflective polarizer.

Likewise, base claim 20 defines a liquid crystal display device comprising:

an illumination device;
a light control element arranged at a projected light side of the illumination device;
a reflective polarizer arranged at an upper portion of the light control element so that a polarized light transmission axis of the reflective polarizer is so that a polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element;

a liquid crystal display element for controlling polarization of projected light projected from the reflective polarizer so that a major axis direction of a pixel of the liquid crystal display element is arranged approximately parallel to a direction in which a linearly polarized light component of the polarized light projected from the illumination device is high; and

a screen arranged at an upper portion of the liquid crystal display element;

wherein the light control element is the only light control element arranged between the illumination device and the reflective polarizer.

As previously discussed, when a **single** light control element is arranged between the illumination device and the reflective polarizer as expressly defined in each of Applicants' base claims 1, 13 and 20, the essential feature of Applicants' independent claims 1, 13 and 20, relates to the "reflective polarizer arranged at an upper portion of the light control element so that a polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element". In other words, the "polarized light transmission axis of the reflective polarizer [item 30, as shown in FIG. 5 and FIG. 20] must be adjusted substantially perpendicular or in parallel to the control axis of the light control element."

This feature is critical to Applicants' base claims 1, 13 and 20 because the polarized light conversion efficiency can be improved and the polarized light transmission rate can be increased by making the conversion axis of the optical path conversion element intersect perpendicularly with the polarized light transmission axis of the reflective polarizer. Such reasons are expressly described on page 29, line 13 extending to page 30, line 25 of Applicants' substitute specification.

Simply stated, the polarized light conversion **cannot** be obtained or achieved by the conventional LCD device shown in FIGs. 32-35 of Applicants' background of

the disclosure. In fact, the very deficiencies in the conventional LCD device shown in FIG. 35 and FIG. 36 of Applicants' background of the disclosure, such as the inability to perform polarized light conversion efficiently because linear polarized light polarized by bireflingence of light control element is converted to ellipsoidal polarized light, as solely identified by Applicants, are the basis for Applicants' invention, that is, to solve the above defects by setting "a polarized light transmitting axis of the reflective type polarizer substantially perpendicular or parallel to the conversion axis of the light control element" as expressly defined in each of Applicants' independent claims 1, 13 and 20. In addition, the light control element [which is an anisotropic medium] is arranged between the illumination device and the reflective polarizer in order to increase the transmittance of light of the display. As a result, a thin LCD providing a bright display can be realized.

The noted deficiencies of what the Examiner alleges as "Applicant admitted prior art", as shown in two distinct embodiments of FIG. 35 or FIG. 36 of Applicants' disclosure, are **not** and **cannot** be remedied by the cited column 5, lines 30-41 or anywhere else in Gunjima '816.

Gunjima '816, as a secondary reference, simply discloses an illumination device provided with a direct viewing type display element. A polarized light separating sheet is used to project p-polarized light efficiently.

However, there is **no** disclosure anywhere in Gunjima '816 of Applicants' claimed "reflective polarizer arranged at an upper portion of the light control element so that a polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element" as defined in each of independent claims 1, 13 and 20.

Gunjima '816, at column 5, lines 30-41, only discloses that,

> "it is preferable that the polarizing sheeting provided on the light-incident side of the liquid crystal display element, is disposed such that the transmittance thereof is maximized with respect to the p polarized light component which is emitted from the polarized light separator, for employing the illumination device as the backlight of the liquid crystal display element. That is, **an average direction of an optical axis of polarization of a light ray emitted from the flat light guide in the flat illumination device approximately agrees with the optical axis of polarization of the polarizing sheet on the light-incident side of the liquid crystal display element.**"

Evidently, the Examiner argues on pages 6-7 of the Office Action (Paper No. 20031223) that, because Gunjima '816 describes "the average direction of an optical axis of polarization of a light ray emitted from the flat light guide in the flat illumination device approximately agrees with the optical axis of polarization of the polarizing sheet on the light-incident side of the liquid crystal display element", such a description can be broadly interpreted or construed as Applicants' claimed "the polarized light transmission axis of the reflective polarizer approximately in parallel to a major axis direction of pixel of the liquid crystal display element, and that the "polarized light transmission axis of the reflective polarizer must be adjusted substantially perpendicular or in parallel to the control axis of the light control element so as to obtain a maximized transmittance."

However, this line of argument is factually incorrect. Either the cited column 5, lines 30-41, Gunjima '816, discloses or does **not** disclose Applicants' claimed "reflective polarizer arranged at an upper portion of the light control element so that a polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element" as defined in each of independent claims 1, 13 and 20. There is **no**

basis for speculation or interpretation. In fact, there is **no** basis anywhere in Gunjima '816 to support the Examiner's assertion that the polarized light transmission axis of the reflective polarizer must be adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element.

On page 6 of the Office Action (Paper No. 200321223), the Examiner further asserts that Gunjima '816 discloses,

> "(col. 5, lines 30-41) that the polarizing sheet provided on the light-incident side of the liquid crystal display element, such that the transmittance thereof is maximized with respect to the **p** polarized light component which is emitted from the polarized light separator."

However, as a practical example, only a case wherein an axis of the polarized light separator is aligned with the axis of polarized light is disclosed. Further, as described on the cited column 5, lines 30-41, Gunjima '816 only discloses that an average direction of an optical axis of polarization of a light ray emitted from the flat light guide in the flat illumination device approximately agrees with the optical axis of polarization of the polarizing sheet on the light-incident side of the liquid crystal display element, but does **not** describe on the relation with the axis of light control element 40, as shown in FIG. 5 and defined in each of Applicants' base claims 1, 13 and 20.

In contrast to Gunjima '816, Applicants' base claims 1, 13 and 20 require that the optical axis of the light control element is adjusted with the axis of the polarized light aiming at increasing transmittance by decreasing polarized light dissolution of the light control element. A practical result is shown in FIG. 5, as element 20, wherein the conversion axis of the light control element is intercrossed perpendicularly with the polarized light transmitting axis of the reflective type

polarizer to improve the polarized light conversion efficiency and the polarized light transmittance.

The reason is that, as described in page 29, line 13 to page 30, line 25 of Applicants' substituted specification, the issue can be solved by making the conversion axis of the light control element be parallel or perpendicular to the polarized light transmittance axis of the reflective type polarizer.

In order to establish a *prima facie* case of obviousness under 35 U.S.C. §103, the Examiner must show that the prior art reference (or references when combined) must teach or suggest all the claim limitations, and that there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skilled in the art, to modify the reference or to combine reference teachings, provided with a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and **not** based on Applicants' disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP 2143. In other words, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USQP 494, 496 (CCPA 1970). In addition, "obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." ACS Hospital System, Inc v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). The Examiner must point to something in the prior art that suggests in some way a

modification of a particular reference or a combination of references in order to arrive at Applicants' claimed invention. Absent such a showing, the Examiner has improperly used Applicants' disclosure as an instruction book on how to reconstruct to the prior art to arrive at Applicants' claimed invention.

In the present situation, the Examiner has **not** addressed and adequately supported the selection and combination of what the Examiner alleges as Applicant's Admitted Prior Art (AAPA) shown in two distinct embodiments of FIG. 35 and FIG. 36, and Gunjima '816 to render Applicants' claimed invention obvious. The Examiner's conclusory statement that "it would have been obvious ... to arrange such reflective polarizer in which the polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or in parallel to the control axis of the light control element" do not adequately address the issue of motivation to combine, particularly when FIG. 35 and FIG. 36 are two different and distinct embodiments of conventional LCD devices. This factual question of motivation is material to patentability, and cannot be resolved on subjective belief and unknown authority. It is indeed improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983). Thus, the Examiner must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the conclusion. Any deficiencies of the cited references cannot be remedied by general conclusions about what is "basic knowledge" or "common sense". In re Sang Su Lee, No. 00-1158 (Fed. Cir. 2002).

In the present situation, as previously pointed out, the Examiner has ignored to treat the claim invention as a whole, misinterpreted the disclosure of Gunjima '816, and incorrectly employed impermissible hindsight reconstruction to incorporate Gunjima '816 into what the Examiner alleges as "Applicant admitted prior art", failed to provide any suggestion or motivation in the references themselves to modify Gunjima '816 into what the Examiner alleges as "Applicant admitted prior art" in order to arrive at Applicants' claims 1, 13 and 20.

Separately, Applicants' independent claim 20 further defines at least another feature that has not been addressed by the Examiner and that is not disclosed or suggested anywhere in the Examiner's proposed combination, that is, "a liquid crystal display element for controlling polarization of projected light projected from the reflective polarizer so that a major axis direction of a pixel of the liquid crystal display element is arranged approximately parallel to a direction in which a linearly polarized light component of the polarized light projected from the illumination device is high." Again, no where in the Examiner's proposed combination is there any reference to such a feature.

With respect to Applicants' claims 2 and 3, a geometrically vertical axis forming a vertical-lateral ratio of the pixel at 3:1 is called as a major axis, and as such, is **not** and cannot be construed as the polarized light axis as referred by Gunjima '816. Simply, Gunjima '816 does **not** disclose any "major axis direction". Gunjima '816 only discloses an arrangement of a polarizer so as to emit P polarized light efficiently, but does **not** disclose that the polarizer should be adjusted in what direction of the pixel.

As shown in FIG. 9, Applicants' disclosed invention describes a composition wherein a direction of high directivity from the illuminating device should be adjusted with a direction along with the minor axis of the pixel. In order to increase directivity of the minor axis direction, it is necessary to adjust the minor axis direction of the pixel perpendicularly with the stripe grooves of the illuminating device. Because the light projected from the illuminating device has a large polarized component in parallel to the stripe grooves, a display, which does not any mixing colors among pixels, can be realized by adjusting the axis of the light projected from the illuminating device with the transmitted polarized light axis of the reflective type polarizer and the major axis of the pixel (the pixels are composed of RGB pixels and the vertical-lateral ration of the pixel is formed as 3:1).

In addition, Applicants' disclosed invention also realizes a wide view angle by diffusing light at surface by adjusting a direction of high directivity from the illuminating device with a direction along with the minor axis of the pixel. If the directivity (parallel degree) of the light in the minor axis direction is not high, color mixing is generated, and a clear color display cannot be realized. Therefore, a high directivity is arranged in the minor axis direction.

With respect to Applicants' claims 26, 30, and 40, the preferable direction of the major axis of the pixel is in parallel to the stripe direction of the reflector is well known to the public. However, the direction of the major axis of the pixel in parallel to the stripe direction of the reflector is preferable not for increasing brightness as the Examiner pointed out, but necessary for keeping clear resolution. The brightness cannot be deemed as to be improved. Again, nowhere in the Examiner's proposed combination is there any reference to such a feature.

With respect to Applicants' claims 9 and 16, when isotropic medium is used, no problem is caused. Again, nowhere in the Examiner's proposed combination is there any reference to such a feature.

In view of the foregoing deficiencies of the Examiner's proposed combination and the explanations provided above, Applicants respectfully request that the rejection of claims 1-3, 5-7, 10, 12-14, 17-18, 20 and 22 be withdrawn.

Claims 8, 15, 21, 26, 30 and 34 have been rejected under 35 U.S.C. §103 as being unpatentable over what the Examiner alleges as "Applicant admitted prior art" and Gunjima et al., U.S. Patent No. 5,587,816 as applied to claims 1-3, 5-7, 10, 12-14, 17-18, 20 and 22, further in view of Yuuki et al., U.S. Patent No. 6,147,725 and the newly cited art, Taira et al., U.S. Patent No. 5,712,694 for reasons stated on pages 7-8 of the premature final Office Action (Paper No. 25). Again, as previously discussed, Yuuki '725 does **not** qualify as prior art against Applicants' claims 8, 15, 21, 26, 30 and 34, because Applicants' claimed priority to an earlier JP application No. 10-68128 filed on March 18, 1998 predates the filing date of October 20, 1998 of Yuuki '725. As a result, Yuuki '725 has **no** place in the rejection and, should be eliminated from this rejection.

Claims 9 and 16 have been rejected under 35 U.S.C. §103 as being unpatentable over what the Examiner alleges as "Applicant admitted prior art" and Gunjima et al., U.S. Patent No. 5,587,816 as applied to claims 1-3, 5-7, 10, 12-14, 17-18, 20 and 22, further in view of Wortman et al., U.S. Patent No. 6,101,032 for reasons stated on pages 12-13 of the Office Action (Paper No. 20031223). Since the correctness of this rejection is predicated upon the correctness of the rejection of claims 1-3, 5-7, 10, 12-14, 17-18, 20 and 22, Applicants respectfully traverse the

rejection primarily for the same reasons discussed against the rejection of claims 1-3, 5-7, 10, 12-14, 17-18, 20 and 22.

Separately, base claims 1, 13 and 20 have also been rejected under 35 U.S.C. §103(a) as being unpatentable over what the Examiner alleges as "Applicant admitted prior art" in view of newly cited art, Weber et al., U.S. Patent No. 6,025,897 for reasons stated on pages 3-5 of the Office Action (Paper No. 20031223). Again, in support of this rejection, the Examiner selects individual elements from two different embodiments of a conventional LCD device, as shown in FIG. 35 and FIG. 36 of Applicants' disclosure, and then cites column 9, lines 43-67, FIG. 11 of Weber '897, as a secondary reference, for allegedly disclosing that,

> "the optically structure layer (113) and structure surface (112) (also can be a light control element, because the function is to control light), and with the reflective polarizer (116) to make up a brightness enhanced reflective polarizer (110), and the light transmitted by optically structure layer (113) passes through the reflective polarizer (116) at near normal angle (perpendicular to reflective polarizer), so that is a polarized light transmission axis of the reflective polarizer to be adjusted substantially perpendicular to a control axis of the light control element, so as to enhance the brightness and to achieve an adequate contrast for the display"

in order to support an assertion that "it would have been obvious ... to arrange such reflective polarizer in which the polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or in parallel to the control axis of the light control element as claimed in claims 1, 13 and 20 for achieving maximum light transmittance and widen the viewing angle."

However, this rejection is respectfully traversed. Applicants respectfully submit that features of Applicants' base claims 1, 13 and 20 are not taught or suggested by what the Examiner alleges as "Applicant Admitted Prior Art" (shown in

FIG. 35 and FIG. 36) in view of newly cited art, Weber et al., U.S. Patent No. 6,025,897, whether taken individually or in combination with any other references of record. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection for the following reasons.

First of all, and as previously discussed, FIG. 35 and FIG. 36 are directed to two different embodiments of conventional LCD devices, that are **not** compatible and, can**not** be combined in the manner suggested by the Examiner.

For example, FIG. 35 shows an embodiment of a conventional LCD device in which a light control element 40 is used. However, polarization conversion efficiency is decreased significantly because "the polarizing conversion cannot be performed effectively by only a single reflection with the conventional composition ... Consequently, the absorption by the respective components is increased." See page 28, line 8 extending to page 29, line 12 of Applicants' disclosure.

In order to address the polarization conversion inefficiency defects, FIG. 36 shows another embodiment of a conventional LCD device in which two light polarizers, i.e., **two optical control elements 40, 42** are used to adjust the polarized light transmitting axis (31) of the reflective polarizer (30) substantially perpendicular or parallel to the conversion axis of the light control elements (40, 42) so as to obtain a maximum transmittance. However, two optical control elements 40, 42 are used, as shown in FIG. 36 of Applicants' disclosure, and when the two optical control elements 40, 42 are used, multi-reflection is repeated and the efficiency is decreased significantly due to the influence of the change in the polarization, as described on pages 32-33 of Applicants' specification. In addition, polarized light dissolution will be generated.

In contrast to the background art, as shown in FIG. 35 and FIG. 36 of Applicants' disclosure, Applicants' disclosed invention seeks to address noted deficiencies of two different embodiments of a conventional LCD device, as shown FIG. 35 and FIG. 36. Specifically, Applicants' independent claims 1, 13 and 20 each defines the use of a **single** light control element arranged at a projected light side of the illumination device in order to increase transmittance of the display light, and that such a light control element is the **only** light control element arranged between the illumination device and the reflective polarizer, and that the polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element. As a result, the conversion axis of the light control element is intercrossed perpendicularly with the polarized light transmitting axis of the reflective polarizer so as to improve the polarized light conversion efficiency and the polarized light transmittance.

Even assuming that FIG. 35 and FIG. 36 can be combined, which Applicants strongly disagree, nowhere in either FIG. 35 or FIG. 36 is there any identification or recognition of the problems that are addressed by Applicants' base claims 1, 13 and 20, that is, the use of a **single** light control element arranged at a projected light side of the illumination device, between the illumination device and the reflective polarizer, and that the polarized light transmission axis of the reflective polarizer is adjusted so as to be substantially perpendicular or substantially parallel to a control axis of the light control element. As a result, the conversion axis of the light control element is intercrossed perpendicularly with the polarized light transmitting axis of

the reflective polarizer so as to improve the polarized light conversion efficiency and the polarized light transmittance.

Weber '897, as a secondary reference, does **not** remedy the noted deficiencies of FIG. 35 or FIG. 36, in order to arrive at Applicants' base claims 1, 13 and 20. This is because Weber '897 simply discloses the use of a multiple layer reflective polarizer 12, as shown in FIG. 4, intended to provide adequate brightness and contrast under both ambient and backlight illumination. As shown in FIG. 2, multiple polarizers such as a front polarizer 18 and a rear polarizer 23 are also used.

Nevertheless, the Examiner cites column 9, lines 43-67, FIG. 11 of Weber ' 897, as a secondary reference, for allegedly disclosing that,

> "the optically structure layer (113) and structure surface (112) (also can be a light control element, because the function is to control light), and with the reflective polarizer (116) to make up a brightness enhanced reflective polarizer (110), and the light transmitted by optically structure layer (113) passes through the reflective polarizer (116) at near normal angle (perpendicular to reflective polarizer), so that is a polarized light transmission axis of the reflective polarizer to be adjusted substantially perpendicular to a control axis of the light control element, so as to enhance the brightness and to achieve an adequate contrast for the display."

However, the Examiner's citation is misplaced. On column 8, line 64 to column 9, line 27, Weber '897 discloses a theory of enhancing brightness by adjusting the transmission axis of absorptive polarizer with the transmission axis of reflective polarizer. Weber '897 is completely silent as to whether the polarized light transmission axis is perpendicular or parallel to the control axis of light control element.

As a result, even if Weber '897 is to be incorporated into the arbitrary combination of FIG. 35 and FIG. 36, the proposed incorporation still does not arrive

at Applicants' base claims 1, 13 and 20. Therefore, in view of the foregoing deficiencies of the Examiner's proposed combination and the explanations provided above, Applicants respectfully request that the rejection of claims 1, 13 and 20 be withdrawn.

More importantly, claims 11, 19, 25, 29 and 33, which have previously been allowed without the necessity of amendment as indicated in previous Office Action (Paper No. 25) dated on September 5, 2003, have now been rejected in an arbitrary and capricious manner.

For example, claims 11 and 19 have now been rejected under over what the Examiner alleges as "Applicant admitted prior art" in view of Gunjima et al., U.S. Patent No. 5,587,816 for reasons stated on pages 13-15 of the Office Action (Paper No. 20031223). However, Applicants' base claims 11 and 19 further define the specific of a liquid crystal element as including:

> "at least a pair of transparent substrates;
> a liquid crystal layer interposed between the pair of transparent substrates; and
> a pair of absorption type polarizers arranged so that the pair of transparent substrates are held between pair of absorption type polarizers; and
> wherein a half-value width of projected light θ_1 (an angular range wherein a brightness becomes 1/2 of a peak value) from the illumination device in at least a certain direction satisfies a relationship expressed by the following equation:
> $\theta_1 \leq \sin^{-1}(n \cdot \sin(\tan^{-1}(2d/t)))$
> where
> t is a thickness of each of the pair of transparent substrates,
> n is a refractive index of each of the pair of transparent substrates,
> and
> d is a length of the pixel in a minor axis direction of the pixel."

Nowhere on pages 13-15 of the Office Action (Paper No. 20031223) is there an indication that the Examiner has addressed these features of Applicants' base

claims 11 and 19. On page 14 of the Office Action (Paper No. 20031223), the Examiner cites column 10, lines 20-40 of Gunjima '816 for using the equation:

$\theta_c=\sin^{-1}(1/n)=42.4^0$ to obtain the angle of incident light.

However, this equation has absolutely nothing to do with Applicants' claimed "half-value width of projected light θ_1 (an angular range wherein a brightness becomes 1/2 of a peak value) from the illumination device in at least a certain direction satisfies a relationship expressed by the following equation:

$$\theta_1 \leq \sin^{-1}(n \cdot \sin(\tan^{-1}(2d/t)))$$

where:

t is a thickness of each of the pair of transparent substrates,

n is a refractive index of each of the pair of transparent substrates,

and

d is a length of the pixel in a minor axis direction of the pixel" as currently defined in each of Applicants' base claims 11 and 19.

Therefore, in view of the foregoing deficiencies of the Examiner's proposed combination and the explanations provided above, Applicants respectfully request that the rejection of claims 1 and 19 be withdrawn, and that claims 11 and 19 be placed in condition for allowance as indicated previously.

Lastly, claims 25, 29 and 33 have now been rejected under over what the Examiner alleges as "Applicant admitted prior art" in view of Weber, U.S. Patent No. 6,025,897 and newly cited art, Nakamura et al., U.S. Patent No. 5,986,723 for reasons stated on pages 15-17 of the Office Action (Paper No. 20031223). However, Applicants' base claims 25, 29 and 33 further define the specific relationship between the pixel length in the major axis direction relative to the pixel length in the minor axis direction as being "substantially 3:1". Specifically, Applicants' base claims 25, 29 and 33 define "wherein a ratio of length of the pixel in

the major axis direction to a length of the pixel in a minor axis direction of the pixel is substantially 3:1."

On page 17 of the Office Action (Paper No. 20031223), the Examiner cites column 1, line 66 extending to column 2, line 53, and FIG. 17 of Nakamura '723 for allegedly disclosing Applicants' claimed "ratio of length of the pixel in the major axis direction to a length of the pixel in a minor axis direction of the pixel is substantially 3:1" as defined in base claims 25, 29 and 33.

However, the Examiner's citation is also misplaced and completely out of context. FIG. 17 of Nakamura '723 shows a LCD device with a hologram optical element (HOE) 102 used to separate optical rays from the incident light, focalize them on its focal plane, and form a continuous spectrum distribution. The HOE 102 is provided with a set of pixels corresponding to R, G and B colors. For each pixel, the pixel length and breadth (width) ratio is 3:1. However, such pixel length and breadth has nothing to do with Applicants' claimed "ratio of length of the pixel in the **major axis direction** to a length of the pixel in a **minor axis direction** of the pixel is substantially 3:1" as defined in Applicants' base claims 25, 29 and 33.

Therefore, in view of the foregoing deficiencies of the Examiner's proposed combination and the explanations provided above, Applicants respectfully request that the rejection of claims 25, 29 and 33 be withdrawn, and that claims 25, 29 and 33 be placed in condition for allowance as indicated previously.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is

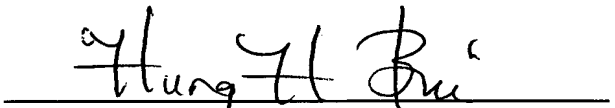
requested to telephone Applicants' attorney at the Washington DC area office at (703) 312-6600.

INTERVIEW:

In the interest of expediting prosecution of the present application, Applicants respectfully request that an Examiner interview be scheduled and conducted. In accordance with such interview request, Applicants respectfully request that the Examiner, after review of the present Amendment, contact the undersigned local Washington, D.C. area attorney at the local Washington, D.C. telephone number (703) 312-6600 for scheduling an Examiner interview, or alternatively, refrain from issuing a further action in the above-identified application as the undersigned attorneys will be telephoning the Examiner shortly after the filing date of this Amendment in order to schedule an Examiner interview. Applicants thank the Examiner in advance for such considerations. In the event that this Amendment, in and of itself, is sufficient to place the application in condition for allowance, no Examiner interview may be necessary.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, No. 01-2135 (Application No. 503.36984X00), and please credit any excess fees to said deposit account.

Respectfully submitted,
ANTONELLI, TERRY, STOUT & KRAUS, LLP

By 
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